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(71)Applicant : VICTOR CO OF JAPAN LTD

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(72)Inventor : KONO KEIZO

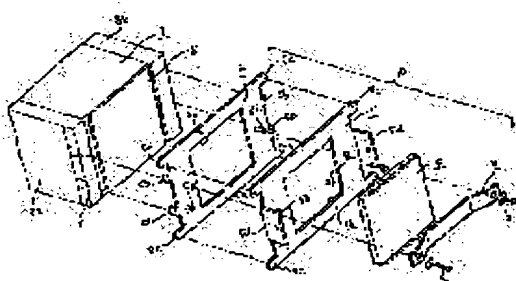
HASEGAWA YOSHITERU

(54) FIXING STRUCTURE OF SOLID-STATE IMAGE PICKUP ELEMENT AND ITS
FIXING METHOD

(57)Abstract:

PURPOSE: To facilitate back focus adjustment and registration adjustment with respect to a prism by pressing elastically a fixed image pickup element onto an element holder so as to assemble the element in a displacing enable way.

CONSTITUTION: Each intermediate member is pressed elastically and fixed by overlapping sequentially a metal made plate element holder 7 with a solid-state image pickup element 5 onto a metal made plate element base 6 and screw-fitting the element base 6 with a screw 9 via a plate spring 8. In this case, a diameter of a throughhole 7b to which a mount stud 6d is



inserted is selected sufficiently larger so that the element holder 7 is moved with

respect to the element base 6. In the tentative assembling state, back focus in forward/ backward direction and a deflection in every direction are adjusted with respect to an optical axis of a color separation prism 1 and a metallic film 4 of the prism and a folded piece 6b are soldered. Furthermore, the element holder 7 is skided for 3-color registration adjustment and connecting pieces 6c, 7c, are soldered to fix the element.

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CLAIMS

[Claim(s)]

[Claim 1] The component base which made the mounting stud stand up while carrying out opening of the light-receiving side side of a solid state image pickup device and said solid state image pickup device, having the 1st connection fixed to the optical outgoing radiation side side of color-separation prism and having the 2nd connection, While laying said solid state image pickup device, carry out opening of that light-receiving side side, and it has a ***** insertion hole from this stud so that said mounting stud may be inserted in. And said solid state image pickup device on the component holder equipped with said 2nd connection and the connection connected and said component holder is pressed elastically. Fixed structure of the solid state image pickup device characterized by considering as a solid state image pickup device assembly from the elastic member fixed to said mounting stud so that displacement of said component holder may be attained to said component base.

[Claim 2] The component base which made the mounting stud stand up while carrying out opening of the light-receiving side side of a solid state image pickup device and said solid state image pickup device, having the 1st connection fixed to the optical outgoing radiation side side of color-separation prism and having the 2nd connection, While laying said solid state image pickup device, carry out opening of that light-receiving side side, and it has a ***** insertion hole from this stud so that said mounting stud may be inserted in. And said solid state image pickup device on the component holder equipped with said 2nd connection and the connection connected and said component holder is pressed elastically. It consists of an elastic member fixed to said mounting stud so that displacement of said component holder may be attained to said component base as a solid state image pickup device assembly. Make said component holder of said solid state image pickup device assembly correspond with the fixed part of said color-separation prism, and after adjusting a back focus, said the 1st connection and said fixed part of said component base are fixed. The fixed approach of the solid state image pickup device which is made to carry out the variation rate of said component holder to said component base, and is characterized by coming to fix the connection of said component holder, and said 2nd connection of said component base after registration adjustment.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the fixed approach of solid state image pickup devices, such as a charge-coupled device (CCD) used for a television camera etc.

[0002]

[Description of the Prior Art] Conventionally, it sets to a television camera etc. The image pick-up light of the photographic subject by which outgoing radiation is carried out from optical system with 3 color-separation prism (color-separation prism) Red (R), After decomposing into the three primary colors of green (G) and blue (B) and carrying out photo electric translation of the photographic subject image of each color component to the video signal of each color with three solid state image pickup devices, respectively, It is well-known to carry out as [acquire / carry out various kinds of signal processing from each image pick-up output, for example, / the composite color video signal (television signal) of NTSC system].

[0003] The solid state image pickup device for carrying out photo electric translation of the photographic subject image of each above-mentioned color component is being fixed to each optical outgoing radiation side side through the prism base of the couple fixed to color-separation prism. These solid state image pickup devices are fixed to accuracy where back focus adjustment and registration adjustment of mum order are performed to each optical axis using a predetermined fixture, and the activity requires careful caution.

[0004]

[Problem(s) to be Solved by the Invention] By the way, although it is fixed to the optical outgoing radiation side side of the above-mentioned color-separation prism after various kinds of adjustments, such as the above-mentioned back focus adjustment and a gate of the upper and lower sides and right and left, end the above-mentioned solid state image pickup device, many adhesives, screw threads, etc. are used on the occasion of the immobilization.

[0005] Carrying out a deer, the immobilization by the adhesives of a solid state image pickup device is complicated, and it has the trouble that the location of the solid state image pickup device which adhesives invaded between about [requiring time amount],

the component holder, and the spacer, and was adjusted to it with much trouble is out of order. Although there was a proposal which stands a stanchion to prism, is made to carry out fitting of this to the hole of a solid state image pickup device, solders to the clearance between a stanchion and an anchoring hole, and joined both there as shown in JP,59-39580,U, and the junction activity was simplified comparatively, it was difficult for prism to stand a stanchion, and there was a danger that solder would result in the front-face side of prism and a solid state image pickup device, and it was not so effective.

[0006]

[Means for Solving the Problem] This invention is made in view of the above-mentioned technical problem, and is a thing. The 1st invention The component base which made the mounting stud stand up while carrying out opening of the light-receiving side side of a solid state image pickup device and said solid state image pickup device, having the 1st connection fixed to the optical outgoing radiation side side of color-separation prism and having the 2nd connection, While laying said solid state image pickup device, carry out opening of that light-receiving side side, and it has a ***** insertion hole from this stud so that said mounting stud may be inserted in. And said solid state image pickup device on the component holder equipped with said 2nd connection and the connection connected and said component holder is pressed elastically. It is [0007], while offering the fixed structure of the solid state image pickup device characterized by considering as a solid state image pickup device assembly from the elastic member fixed to said mounting stud so that displacement of said component holder may be attained to said component base. The 2nd invention is based on the solid state image pickup device assembly constituted by the 1st invention. Make said component holder of said solid state image pickup device assembly correspond with the fixed part of said color-separation prism, and after adjusting a back focus, said the 1st connection and said fixed part of said component base are fixed. The fixed approach of the solid state image pickup device which is made to carry out the variation rate of said component holder to said component base, and is characterized by coming to fix the connection of said component holder and said 2nd connection of said component base after registration adjustment is offered.

[0008]

[Embodiment of the Invention] Hereafter, it explains to the color video camera of 3 plate type with the application of one example of this invention. Drawing 1 is a decomposition perspective view showing the fixed structure of the solid state image pickup device which becomes this invention, and one example of the fixed approach.

[0009] One example shown in drawing 1 is attached in the 3 color-separation prism 1 by that the video camera of 3 plate type explains at the frame of a device through the prism bases 3a and 3b made from the ceramics attached on the both sides. And with the 3 color-separation prism 1, it is decomposed into three colors of red (R), green (G), and blue (B), and the image pick-up light of the photographic subject by which incidence is carried out to the image pick-up lens (taking lens) which is not illustrated reaches the light-receiving side of a solid state image pickup device 5 through a trimming filter 2 from the optical outgoing radiation side side of the 3 color-separation prism 1.

[0010] The metal coats (metallizing layer) 4, such as copper (Cu) or silver palladium (Ag-Pd), are put on the optical outgoing radiation side side of the above-mentioned prism bases 3a and 3b by the metallizing method.

[0011] By ****ing the component base 6 through flat spring 8 in piles one by one, and screwing the metal tabular component holder 7 equipped with the solid state image pickup device 5 on by 9, each medium member of each other is elastically stuck to the metal tabular component base 6 by pressure, and is fixed to it. These components base 6 and the component holder 7 are all the metals which can be soldered.

[0012] The component base 6 which specifically has the light-receiving side of a solid state image pickup device 5 and corresponding opening 6a is making four connection pieces 6c and 6c and the mounting studs 6d and 6d project in this vertical edge while equipping the center section of both sides with the bending pieces 6b and 6b connected with the metal coat 4 of the prism bases 3a and 3b.

[0013] On the other hand, the component holder 7 has a projection and the tongue-shaped pieces 7d and 7d which surround a solid state image pickup device 5 and which stood up for the connection pieces 7c and 7c corresponding to those both sides further with the connection pieces 6c and 6c of the above-mentioned component base 6 while being equipped with the sufficiently ***** insertion holes 7b and 7b from the path of this stud so that the above-mentioned light-receiving side, corresponding opening 7a, and the above-mentioned studs 6d and 6d may be inserted in.

[0014] On the occasion of mounting, temporary assembling of the solid state image pickup device assembly 10 is carried out here by inserting the sufficiently ***** insertion holes 7b and 7b of the component holder 7 in the studs 6d and 6d of the component base 6, ****ing a solid state image pickup device 5 through flat spring 8, and screwing on Studs 6d and 6d by 9 and 9. While migration [before and after (the direction of an optical axis)] is elastically permitted based on Studs 6d and 6d, as for

the component holder 7 equipped with the solid state image pickup device 5 to the component base 6 by this trial fitting, migration of the upper and lower sides and right and left is permitted with the sufficiently ***** insertion holes 7b and 7b.

[0015] And after adjusting the gate of the back focus of order, the upper and lower sides, and right and left to the optical axis of prism in the condition of having maintained and arranged a trimming filter 2 and predetermined relation with the jig which does not illustrate this solid state image pickup device assembly 10, the bending pieces 6b and 6b of the component base 6 and the metal coat 4 of the prism bases 3a and 3b are fixed with soldering. After an appropriate time, resist the sticking-by-pressure force with the component base 6 in the elastic force of flat spring 8 in the component holder 7 which is carrying out sticking-by-pressure maintenance of the solid state image pickup device 5, and migration or the rotation variation rate of the it top is carried out. After performing registration adjustment of three colors (R, G, B), by fixing the connection pieces 6c and 6c of the component base 6, and the connection pieces 7c and 7c of the component holder 7 with solder. The solid-state image pick-up image component 5 with which back focus adjustment and registration adjustment were performed to accuracy is fixed to the image pick-up light outgoing radiation side of the 3 color-separation prism 1. Thus, since it can specialize separately two times and each above-mentioned adjustment can be performed separately by using a solid state image pickup device assembly, once a back focus is adjusted, in a next activity (registration adjustment), various kinds of tuning can be extremely performed to accuracy so that previous adjustment may not be out of order, consequently the dependability of a device will improve.

[0016]

[Effect of the Invention] As explained in full detail above, according to the fixed structure and its fixed approach of the solid state image pickup device which becomes this invention By having used the solid state image pickup device assembly which carried out the pressure welding of the component holder holding a solid state image pickup device that displacement is relatively free and elastically, and constituted it along the component base Since it can specialize two times and the back focus adjustment and registration adjustment to prism can be performed separately, Once adjustment is performed, in other adjustments performed like backward, there is an advantage whose dependability of devices, such as improvement in the ease of assembly and assembly precision, improves so that may not be out of order. [of a previous adjustment position]

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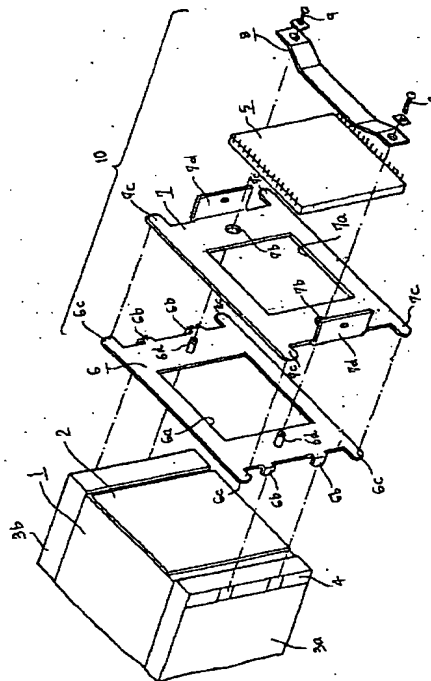
(21)出願番号	特願平8-160816 実願昭63-21375の変更	(71)出願人	000004329 日本ビクター株式会社 神奈川県横浜市神奈川区守屋町3丁目12番地
(22)出願日	昭和63年(1988)2月19日	(72)発明者	河野 景三 神奈川県横浜市神奈川区守屋町3丁目12番地 日本ビクター株式会社内
		(72)発明者	長谷川 義晃 神奈川県横浜市神奈川区守屋町3丁目12番地 日本ビクター株式会社内

(54)【発明の名称】 固体撮像素子の固定構造及びその固定方法

(57)【要約】

【課題】 プリズムに対するバックフォーカス調整およびレジストレーション調整を容易とする。

【解決手段】 固体撮像素子と、前記固体撮像素子の受光面側を開口し、色分解プリズムの光出射面側に固定される第1の接続部を有し、第2の接続部を備えると共に取付スタッドを起立させた素子ベースと、前記固体撮像素子を載置すると共にその受光面側を開口し、前記取付スタッドを挿通するようこのスタッドより径大な挿通孔を有して、かつ前記第2の接続部と接続される接続部を備えた素子ホルダと、前記素子ホルダ上の前記固体撮像素子を弾性的に押圧し、前記素子ベースに対して前記素子ホルダを変位可能となるよう前記取付スタッドに固定される弾性部材とより固体撮像素子組立体とした固体撮像素子の固定構造。



【特許請求の範囲】

【請求項 1】 固体撮像素子と、

前記固体撮像素子の受光面側を開口し、色分解プリズムの光出射面側に固定される第 1 の接続部を有し、第 2 の接続部を備えると共に取付スタッドを起立させた素子ベースと、
前記固体撮像素子を載置すると共にその受光面側を開口し、前記取付スタッドを挿通するようこのスタッドより径大な挿通孔を有して、かつ前記第 2 の接続部と接続される接続部を備えた素子ホルダと、
前記素子ホルダ上の前記固体撮像素子を弾性的に押圧し、前記素子ベースに対して前記素子ホルダを変位可能となるよう前記取付スタッドに固定される弾性部材とより固体撮像素子組立体としたことを特徴とする固体撮像素子の固定構造。

【請求項 2】 固体撮像素子と、

前記固体撮像素子の受光面側を開口し、色分解プリズムの光出射面側に固定される第 1 の接続部を有し、第 2 の接続部を備えると共に取付スタッドを起立させた素子ベースと、
前記固体撮像素子を載置すると共にその受光面側を開口し、前記取付スタッドを挿通するようこのスタッドより径大な挿通孔を有して、かつ前記第 2 の接続部と接続される接続部を備えた素子ホルダと、
前記素子ホルダ上の前記固体撮像素子を弾性的に押圧し、前記素子ベースに対して前記素子ホルダを変位可能となるよう前記取付スタッドに固定される弾性部材とより固体撮像素子組立体としてなり、
前記固体撮像素子組立体の前記素子ホルダを前記色分解プリズムの固定部と対応させてバックフォーカスを調整後に前記素子ベースの前記第 1 の接続部と前記固定部とを固定し、
前記素子ベースに対して前記素子ホルダを変位させてレジストレーション調整後に前記素子ホルダの接続部と前記素子ベースの前記第 2 の接続部とを固定してなることを特徴とする固体撮像素子の固定方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、テレビジョンカメラなどに用いられる電荷結合素子（CCD）などの固体撮像素子の固定方法に関する。

【0002】

【従来の技術】 従来より、テレビジョンカメラなどにおいては、光学系から出射される被写体の撮像光を三色分解プリズム（色分解プリズム）によって赤色（R）、緑色（G）、青色（B）の三原色に分解し、各色成分の被写体像を 3 個の固体撮像素子にて各色の映像信号にそれぞれ光電変換した後、各撮像出力から各種の信号処理をして例えば NTSC 方式の複合カラー映像信号（テレビジョン信号）を得るようにしていることは周知のことであ

る。

【0003】 上記各色成分の被写体像を光電変換するための固体撮像素子は、色分解プリズムに固定された一対のプリズムベースを介して各光出射面側に固定されている。これら固体撮像素子は所定の治具を用いて各光軸に対してバックフォーカス調整や μm オーダのレジストレーション調整を行なった状態で正確に固定されるものであり、その作業は細心の注意を要するものである。

【0004】

10 【発明が解決しようとする課題】 ところで、上記固体撮像素子は上記したバックフォーカス調整や上下、左右のあおりなどの各種の調整が終了した後で、上記色分解プリズムの光出射面側に固定されるものであるが、その固定に際しては接着剤やねじなどが多く使用されている。

【0005】 しかし、固体撮像素子の接着剤による固定作業は煩雑で時間を要するばかりか、素子ホルダとスペーサとの間に接着剤が侵入してせっかく調整された固体撮像素子の位置が狂ってしまう問題点がある。そこで、例えば実開昭 59-39580 号公報に示されるように、プリズムに支柱を立て、これを固体撮像素子の孔に嵌合させ、支柱と取付け孔との隙間に半田付けを施して両者を接合するようにした提案があるが、接合作業は比較的簡素化されるものの、プリズムに支柱を立てることは困難であり、また半田がプリズムおよび固体撮像素子の表面側に至る危険性があってあまり効果的でなかった。

【0006】

【課題を解決するための手段】 本発明は上記の課題に鑑みてなされたものであり、第 1 の発明は、固体撮像素子と、前記固体撮像素子の受光面側を開口し、色分解プリズムの光出射面側に固定される第 1 の接続部を有し、第 2 の接続部を備えると共に取付スタッドを起立させた素子ベースと、前記固体撮像素子を載置すると共にその受光面側を開口し、前記取付スタッドを挿通するようこのスタッドより径大な挿通孔を有して、かつ前記第 2 の接続部と接続される接続部を備えた素子ホルダと、前記素子ホルダ上の前記固体撮像素子を弾性的に押圧し、前記素子ベースに対して前記素子ホルダを変位可能となるよう前記取付スタッドに固定される弾性部材とより固体撮像素子組立体としたことを特徴とする固体撮像素子の固定構造を提供すると共に、

50 【0007】 第 2 の発明は、第 1 の発明によって構成された固体撮像素子組立体に基づいて、前記固体撮像素子組立体の前記素子ホルダを前記色分解プリズムの固定部と対応させてバックフォーカスを調整後に前記素子ベースの前記第 1 の接続部と前記固定部とを固定し、前記素子ベースに対して前記素子ホルダを変位させてレジストレーション調整後に前記素子ホルダの接続部と前記素子ベースの前記第 2 の接続部とを固定してなることを特徴とする固体撮像素子の固定方法を提供するものである。

【0008】

【発明の実施の形態】以下、本発明の一実施例を3板式のカラービデオカメラに適用して説明する。第1図は本発明になる固体撮像素子の固定構造及びその固定方法の一実施例を示す分解斜視図である。

【0009】第1図に示す一実施例を例えば3板式のビデオカメラで説明するに、三色分解プリズム1はその両側に取り付けられたセラミックス製のプリズムベース3a、3bを介して機器のフレームに取付けられるものである。そして、図示しない撮像レンズ（テーキングレンズ）に入射される被写体の撮像光は三色分解プリズム1によって赤色（R）、緑色（G）、青色（B）の三色に分解され、三色分解プリズム1の光出射面側よりトリミングフィルタ2を介して固体撮像素子5の受光面に至るようになっている。

【0010】上記プリズムベース3a、3bの光出射面側にはメタライジング法によって、銅（Cu）、または銀パラジウム（Ag-Pd）などの金属被膜（メタライジング層）4が被着してある。

【0011】金属製の板状の素子ベース6には、固体撮像素子5を備えた金属製の板状の素子ホルダ7を順次重ねて板ばね8を介して素子ベース6をねじ9で螺着することにより、各中間部材は互いに弾性的に圧着され固定される。これら素子ベース6、素子ホルダ7はいずれも半田付け可能な金属である。

【0012】具体的には、固体撮像素子5の受光面と対応した開口6aを有する素子ベース6は、両側の中央部にプリズムベース3a、3bの金属被膜4と接続される折曲片6b、6bを備えると共に、この上下端部には4個の接続片6c、6cおよび取付スタッド6d、6dを突出させている。

【0013】一方、素子ホルダ7は上記受光面と対応する開口7aおよび上記スタッド6d、6dを挿通するようこのスタッドの径より充分径大な挿通孔7b、7bを備えると共に、その両側に上記素子ベース6の接続片6c、6cと対応した接続片7c、7cを突出し、さらに、固体撮像素子5を包囲する起立した舌片7d、7dを有する。

【0014】ここで取付に際しては、素子ベース6のスタッド6d、6dに素子ホルダ7の充分径大な挿通孔7b、7bを挿通し、固体撮像素子5を板ばね8を介してねじ9、9でスタッド6d、6dに螺着することにより固体撮像素子組立体10を仮組みする。この仮組により

素子ベース6に対して固体撮像素子5を備えた素子ホルダ7はスタッド6d、6dを基にして弾性的に前後（光軸方向）の移動が許容されると共に、充分径大な挿通孔7b、7bによって上下・左右の移動が許容される。

【0015】そして、この固体撮像素子組立体10を図示せぬ治具にてトリミングフィルタ2と所定の関係を保って配置した状態で、プリズムの光軸に対して前後のバックフォーカス、上下、左右のあおりを調整した後、素子ベース6の折曲片6b、6bとプリズムベース3a、3bの金属被膜4とを半田付けにて固定する。しかる後、板ばね8の弾性力にて固体撮像素子5を圧着保持している素子ホルダ7を素子ベース6との圧着力に抗してその上を移動または回動変位させ、3色（R、G、B）のレジストレーション調整を行なった後、素子ベース6の接続片6c、6cと素子ホルダ7の接続片7c、7cとを半田にて固定することにより、三色分解プリズム1の撮像光出射面にはバックフォーカス調整、レジストレーション調整が正確に行なわれた固体撮像素子5が固定される。このように固体撮像素子組立体を用いることにより上記各調整を個々に2分化して行なうことができるため、一度バックフォーカスが調整されると、後の作業（レジストレーション調整）では先の調整が狂うようなことはなく、各種の調整作業は極めて正確に行ない得、その結果、機器の信頼性が向上する。

【0016】

【発明の効果】以上詳述した如く、本発明になる固体撮像素子の固定構造及びその固定方法によれば、固体撮像素子を保持する素子ホルダを素子ベースに沿って相対的に変位自在に、かつ弾性的に圧接して構成した固体撮像素子組立体を用いたことにより、プリズムに対するバックフォーカス調整およびレジストレーション調整を2分化して個々に行なうことができるため、一度調整が行なわれると、後行程で行なう他の調整では先の調整位置が狂うようなことはなく、組立の容易性及び組立精度の向上等機器の信頼性が向上する利点がある。

【図面の簡単な説明】

【図1】図1は本発明になる固体撮像素子の固定構造及びその固定方法の一実施例を示す分解斜視図である。

【符号の説明】

1…色分解プリズム、2…トリミングフィルタ、3a、3b…プリズムベース、5…固体撮像素子、6…素子ベース、7…素子ホルダ、8…板ばね、10…固体撮像素子組立体。

【図 1】

